

TA-F170/F240

SERVICE MANUAL

AEP Model
E Model
Germany Model
 TA-F170
UK Model
 TA-F170/F240



Photo: TA-F170

SPECIFICATIONS

Amplifier

Continuous RMS power output (both channels driven simultaneously)

Models for Scandinavian countries, Spain and Portugal

		TA-F170
DIN 1 kHz	6 ohms	50 W + 50 W
	8 ohms	40 W + 40 W
20 Hz - 20 kHz	8 ohms	30 W + 30 W THD 0.05 %

Model Germany

		TA-F170
DIN 1 kHz	4 ohms	50 W + 50 W
	8 ohms	35 W + 35 W
20 Hz - 20 kHz	4 ohms	—
20 Hz - 20 kHz	8 ohms	30 W + 30 W THD 0.05 %

Model UK

		TA-F170	TA-F240
DIN 1 kHz	4 ohms	50 W + 50 W	80 W + 80 W
	8 ohms	40 W + 40 W	70 W + 70 W
20 Hz - 20 kHz	8 ohms	30 W + 30 W THD 0.05 %	60 W + 60 W 0.05 %

AEP, E Model

		TA-F170
DIN 1 kHz	4 ohms	50 W + 50 W
	8 ohms	40 W + 40 W
20 Hz - 20 kHz	4 ohms	—
20 Hz - 20 kHz	8 ohms	30 W + 30 W THD 0.05 %

Tone controls

	Response	Turnover frequency
BASS	± 6 dB	500 Hz
TREBLE	± 6 dB	3 kHz

Input

Input jack		Jack type	Sensi- tivity	Impe- dance	S/N (weighting network, input level)
PHONO	MM	Phono	2.0 mV	50 kilohms	76 dB (A, 5 mV)
	MC		170 μ V	100 ohms	75 dB (A, 0.5 mV)
TUNER, CD, AUX, TAPE/DAT		Phono	150 mV	50 kilohms	96 dB (150 mV)

— Continued on next page —

INTEGRATED STEREO AMPLIFIER
SONY®



TA-F170/F240

Output

Output jack	Jack type	Voltage/impedance
REC OUT	Phono	Voltage 150 mV Impedance 1 kohms
SPEAKERS	—	Model for Scandinavian countries, Spain and Portugal Accepts speakers of 6 – 16 ohms. Models for other countries Accepts speakers of 4 – 16 ohms
HEAD-PHONES	Stereo phone	Accepts low and high impedance headphones.

Loudness (Attenuation 30 dB)

+ 6 dB (100 Hz)/ + 3 dB (10 kHz)

Subsonic filter 6 dB/octave, attenuation below 15 Hz

Intermodulation (IM) distortion (60 Hz: 7 kHz=4: 1)

Less than 0.05% at rated output

Frequency response **PHONE:** RIAA equalization curve ± 0.5 dB

TUNER, CD, AUX, TAPE1/DAT:

7 Hz – 100 kHz ± 3 dB

Residual noise Less than 190 μ V (network A)

Damping factor 40 (8 ohms, 1 kHz)

Power requirements AEP, Germany models:

220 – 230 V AC, 50 Hz

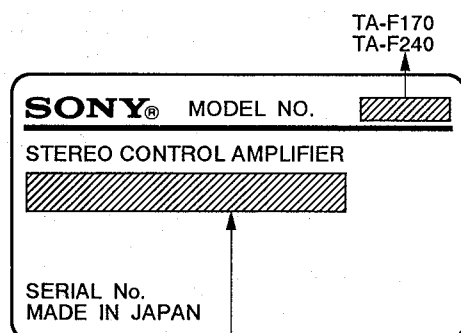
UK model: 240 V AC, 50 Hz

E model: 120 V,

220 V or 240 V AC adjustable, 50/60 Hz

MODEL IDENTIFICATION

— Specification Labels —



AEP, Germany model: AC: 220 – 230 V ~ 50/60 Hz 90 W

TA-F170 UK model: AC: 240 V ~ 50/60 Hz 250 W

TA-F240 UK model: AC: 240 V ~ 50/60 Hz 380 W

E model: AC: 120/220/240 V ~ 50/60 Hz 90 W

Power consumption

Models for	F170	F240
UK	250 W	380 W
Germany	95 W	—
AEP, E	90 W	—

Dimensions

Approx. 430 × 135 × 312 mm (w/h/d)
(17 × 5³/₈ × 12³/₈ inches)

Weight

TA-F170: Approx. 7.6 kg (16 lb 12 oz)
TA-F240: Approx. 8 kg (17 lb 10 oz)

* For all the countries except U.K. and Canada, the above values are measured at 230 V AC.

Design and specifications subject to change without notice.

Note

This appliance conforms with EEC directive 87/308/EEC regarding interference suppression.

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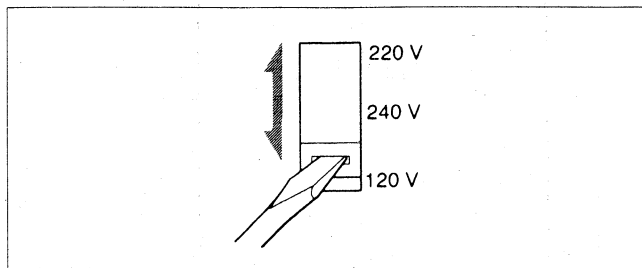
SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK Δ OR DOTTED LINE WITH MARK Δ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!

LES COMPOSANTS IDENTIFIÉS PAR UNE MARQUE Δ SUR LES DIAGRAMMES SCHÉMATIQUES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPLÉMENTS PUBLIÉS PAR SONY.

Precautions



On safety

- Before operating the unit, check that the operating voltage of your unit is identical with the voltage of your local power supply.

Where purchased	Operating voltage
Canada	120 V AC
United Kingdom	240 V AC
Continental European countries	220 – 230 V AC
Other countries	120 V, 220 V or 240 V AC adjustable The voltage selector is located on the rear panel. If the selector must be reset, disconnect the AC power cord and set the selector to the proper voltage of your local power supply.

- Unplug the unit from the wall outlet if it is not to be used for an extended period of time. To disconnect the cord, pull it out by grasping the plug. Never pull the cord itself.
- Should any solid object or liquid fall into the unit, unplug the unit and have it checked by qualified personnel before operating it any further.
- Do not block the ventilation holes on top of the unit. The ventilation holes must be unobstructed for proper operation of the unit and to prolong the life of its components.
- AC power cord must be changed only at the qualified service shop.

On cleaning the cabinet

Clean the cabinet, panels and controls with a soft cloth lightly moistened with a mild detergent solution. Do not use any type of abrasive pad, scouring powder or solvent such as alcohol or benzene.

On repacking

Do not throw away the carton and the packing material. This makes an ideal container when transporting the unit. When shipping the unit, repack it as it was packed at the factory.

If you have any question or problem concerning your unit, please consult your nearest Sony dealer.

Parts Identification/Identification des parties Identificación de partes/Identificação dos comandos

Refer to the pages indicated in ● for details.
Pour les détails, se reporter aux pages indiquées dans les cercles noirs.
Para los detalles, refiérase a las páginas indicadas en ●.
Consulte as páginas indicadas nas ● para mais pormenores.

Connexions

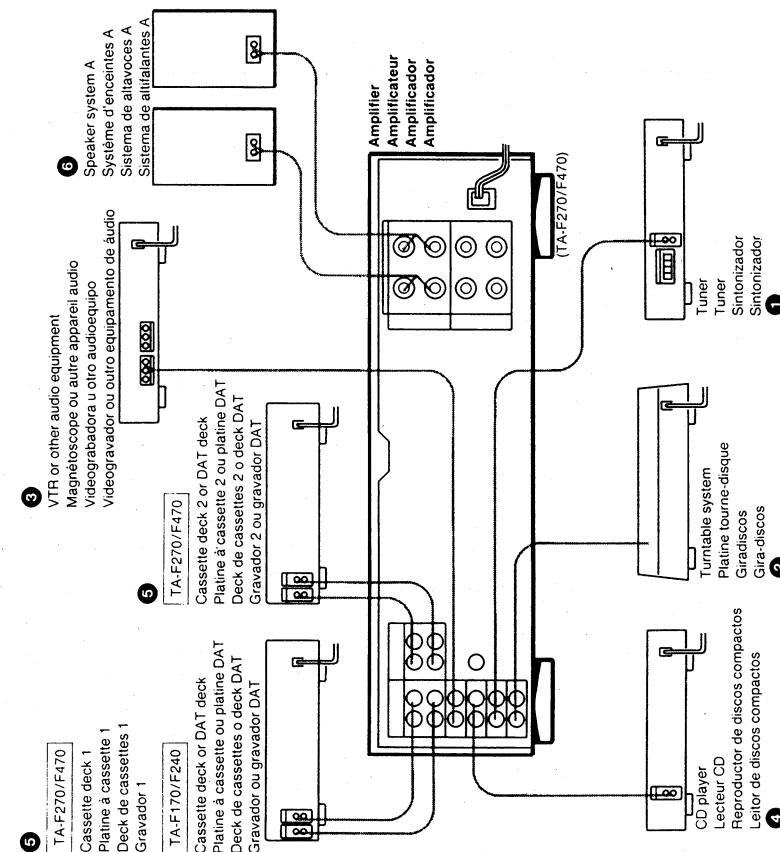
Remarques sur les connexions

- Le cordon d'alimentation doit être branché en dernier lieu, après s'être assuré que l'appareil est bien hors tension.
- Les fiches des cordons et les prises sont codées par couleur. Les fiches et prises rouges sont destinées au canal droit (R) et les blanches, au canal gauche (L).
- Insérer les connecteurs des câbles à fond dans les prises. En effet, une connexion relâchée peut provoquer un ronflement ou du bruit.

Connections

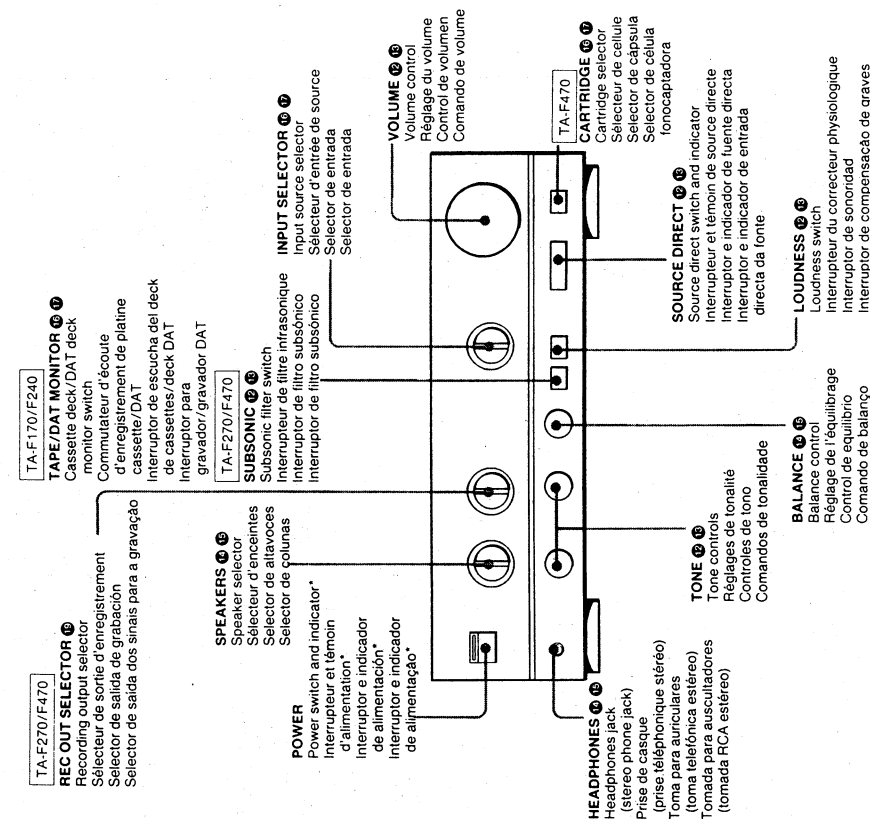
Notes on Connection

- Connect the AC power cord last. Make sure power is off.
- Cord plugs and jacks are color coded. Red plugs and jacks are for right channel (R) and white ones for left channel (L).
- Fully insert cable connectors into jacks. Loose connections may cause hum or noise.



SECTION 1 GENERAL

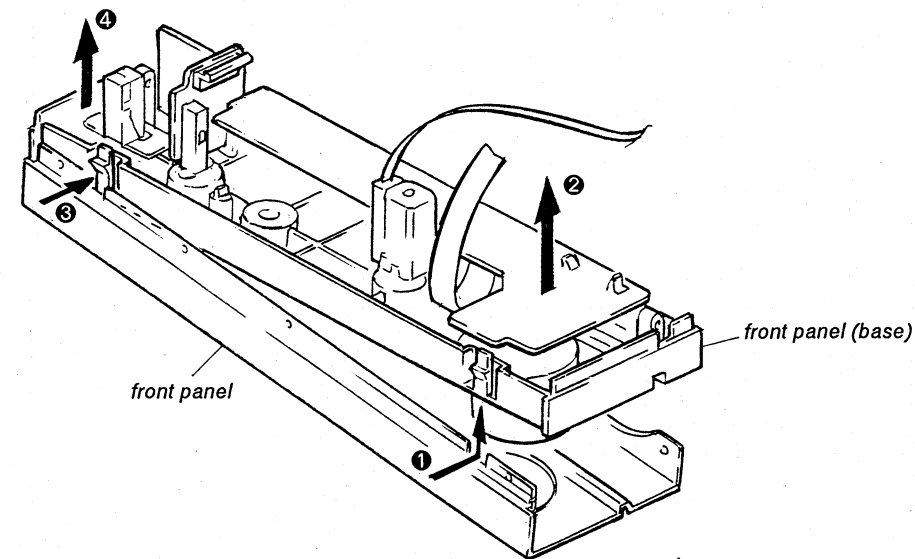
This section is extracted from TA-F170/
F240/F270/F470 instruction manual.



SECTION 2 DISASSEMBLY

2-1. DISASSEMBLY OF FRONT PANEL

Note: Follow the disassembly procedure in the numerical order given.



SECTION 3 ELECTRICAL ADJUSTMENT

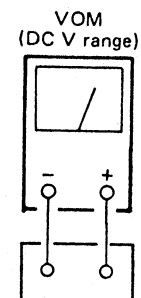
NOTE:

- Adjustment should be performed 10 minutes after the POWER switch is on (POWER ON).

Bias Current Adjustment

Setting:

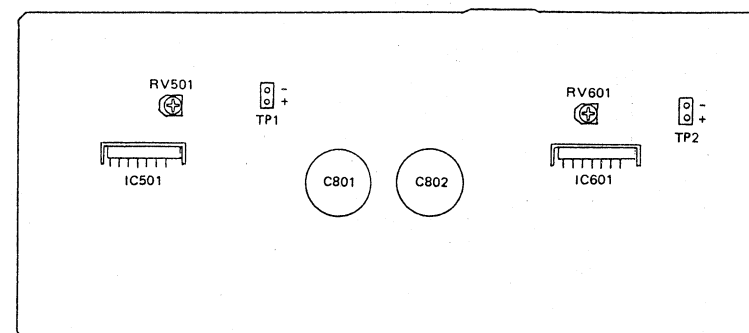
VOLUME control: minimum



TP1 (L-CH)
or
TP2 (R-CH)
on AMP board

Adjustment Location:

[AMP BOARD] — Component Side —

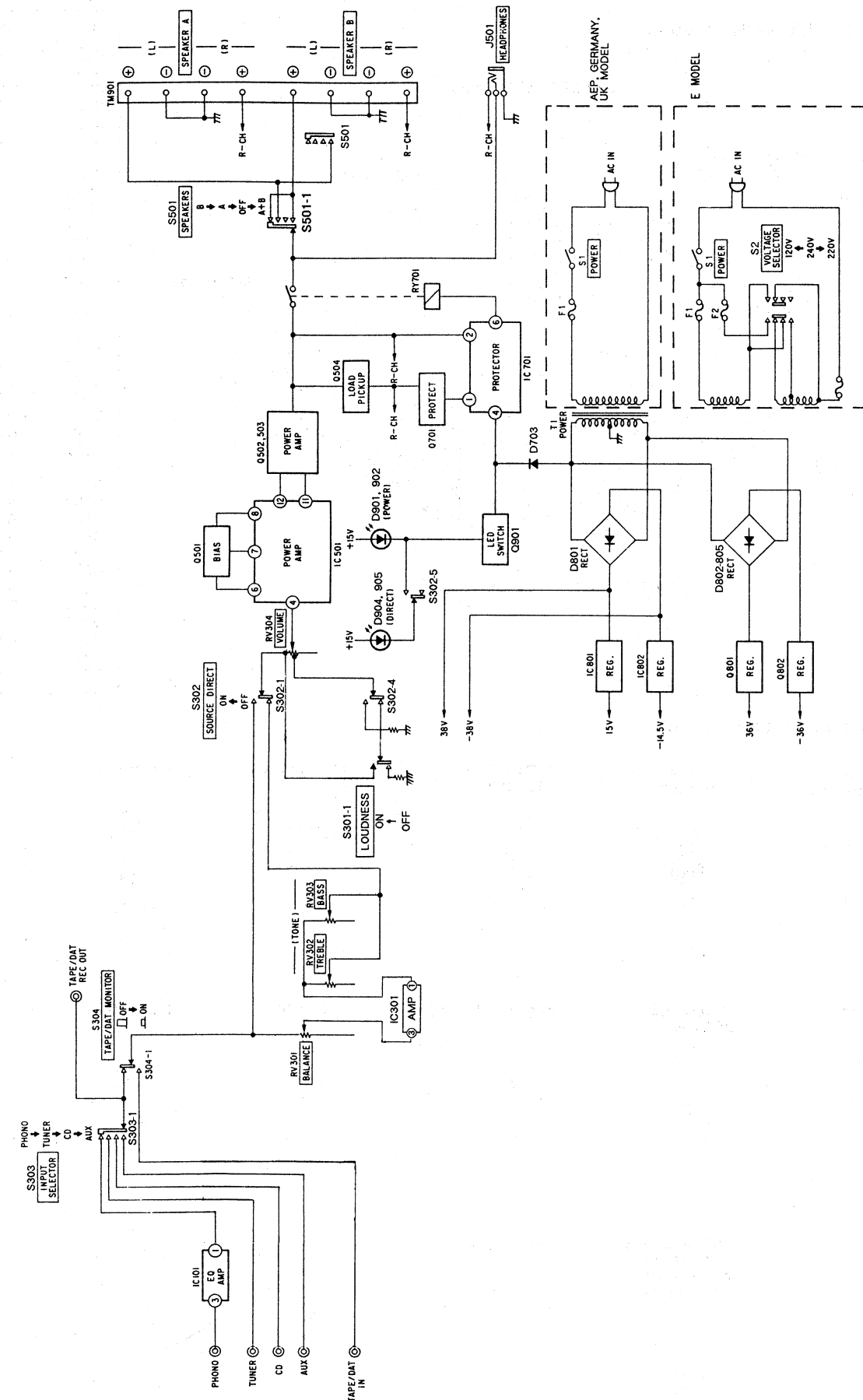


Procedure:

Adjust RV501 (L-CH) and RV601 (R-CH) so as to obtain 4 mV (TA-F120) or 2 mV (TA-F220) at TP1 (L-CH) and TP2 (R-CH) respectively.

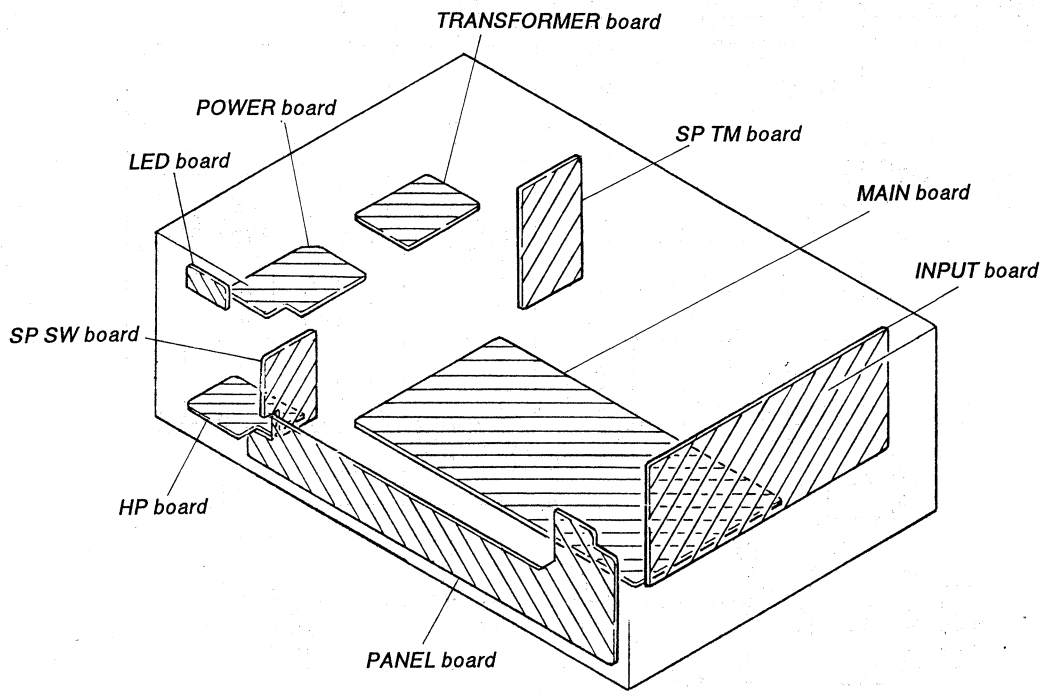
4-1. BLOCK DIAGRAM

SECTION 4 DIAGRAM



4-2. PRINTED WIRING BOARDS

• Circuit Boards Location



• Semiconductor Location

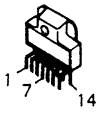
Ref. No.	Location
D501	B-15
D502	B-15
D601	B-11
D602	B-11
D701	D-14
D702	E-14
D703	E-12
D801	E-10
D802	E-13
D803	E-13
D804	F-13
D805	F-13
D901	H-15
D902	H-15
D904	K-8
D905	K-8
IC101	F-4
IC301	J-14
IC501	C-15
IC601	D-9
IC701	D-14
IC801	D-7
IC802	D-8
Q501	A-13
Q502	A-14
Q503	A-12
Q504	B-15
Q601	A-9
Q602	A-10
Q603	A-8
Q604	B-11
Q701	D-14
Q801	E-15
Q802	F-15
Q901	E-15

• Semiconductor Lead Layouts

M5218AL
μ PC1237HA



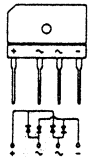
μ PC1298V
μ PC1342V



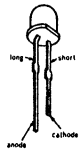
2SB1370-EF
2SD2012



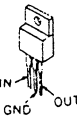
RBV-602-01



SEL2510C-C



TA7815S



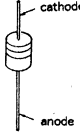
DTA124ES
2SC2603-EF



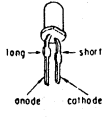
2SC1841-PAFAEA



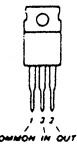
1SS120



SEL2810A-C



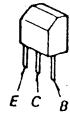
TA7915S



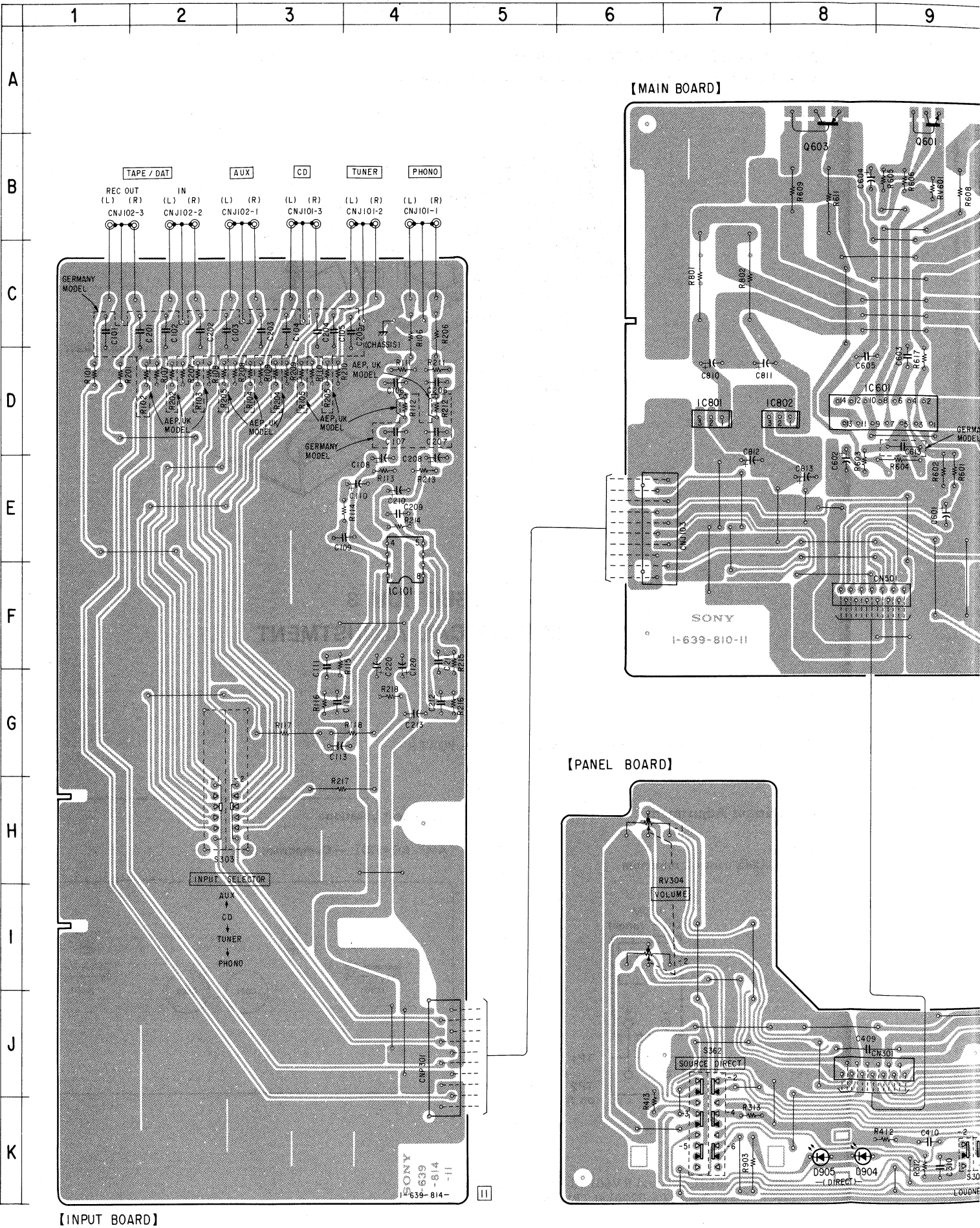
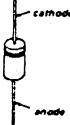
2SA1490-OPY
2SA1491-OY
2SC3854-OY
2SC3855-OY



2SD1312-K



10E2



1 2 3 4 5 6 7 8 9 10 11 12

A

B

C

D

E

F

G

H

I

J

[INPUT BOARD]

TAPE REC IN AUX CD TUNER PHONO PHONO CD AUX TAPE REC

IC101 EQ AMP

IC301 AMP

IC601 POWER AMP

[PANEL BOARD]

MONITOR OFF ON

INPUT SELECTOR AUX CD TUNER PHONO

SOUCE DIRECT OFF ON

LOUDNESS ON OFF

[MAIN BOARD]

Q501 2SC3855

Q602 2SA1491

Q603 2SA1491

R705 390 1W

R704 12k

R706 6.8k

R801 120 3W

R802 470 3W

C807 47 50V

C808 50V

C801 6800 50V

C802 50V

C803 470 50V

C804 50V

IC501 PC1298V

IC601 PC1298V

R510 511 0.22

R610 611 2W

C805 22 22

C806 50V 50V

F1 1.6A

Q801 2SC3855

Q802 2SA1491

Q803 2SA1491

R801 120 3W

R802 470 3W

C807 47 50V

C808 50V

C801 6800 50V

C802 50V

C803 470 50V

C804 50V

IC501 PC1298V

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C801 6800 50V

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IC601 PC1298V

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R802 470 3W

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C808 50V

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IC601 PC1298V

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C806 50V 50V

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R802 470 3W

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C808 50V

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C802 50V

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C804 50V

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IC601 PC1298V

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R610 611 2W

C805 22 22

C806 50V 50V

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Q802 2SA1491

Q803 2SA1491

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R802 470 3W

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C801 6800 50V

C802 50V

C803 470 50V

C804 50V

IC501 PC1298V

IC601 PC1298V

R510 511 0.22

R610 611 2W

C805 22 22

C806 50V 50V

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C802 50V

C803 470 50V

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IC501 PC1298V

IC601 PC1298V

R510 511 0.22

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R510 511 0.22

R610 611 2W

C805 22 22

C806 50V 50V

F1 1.6A

Q801 2SC3855

Q802 2SA1491

Q803 2SA1491

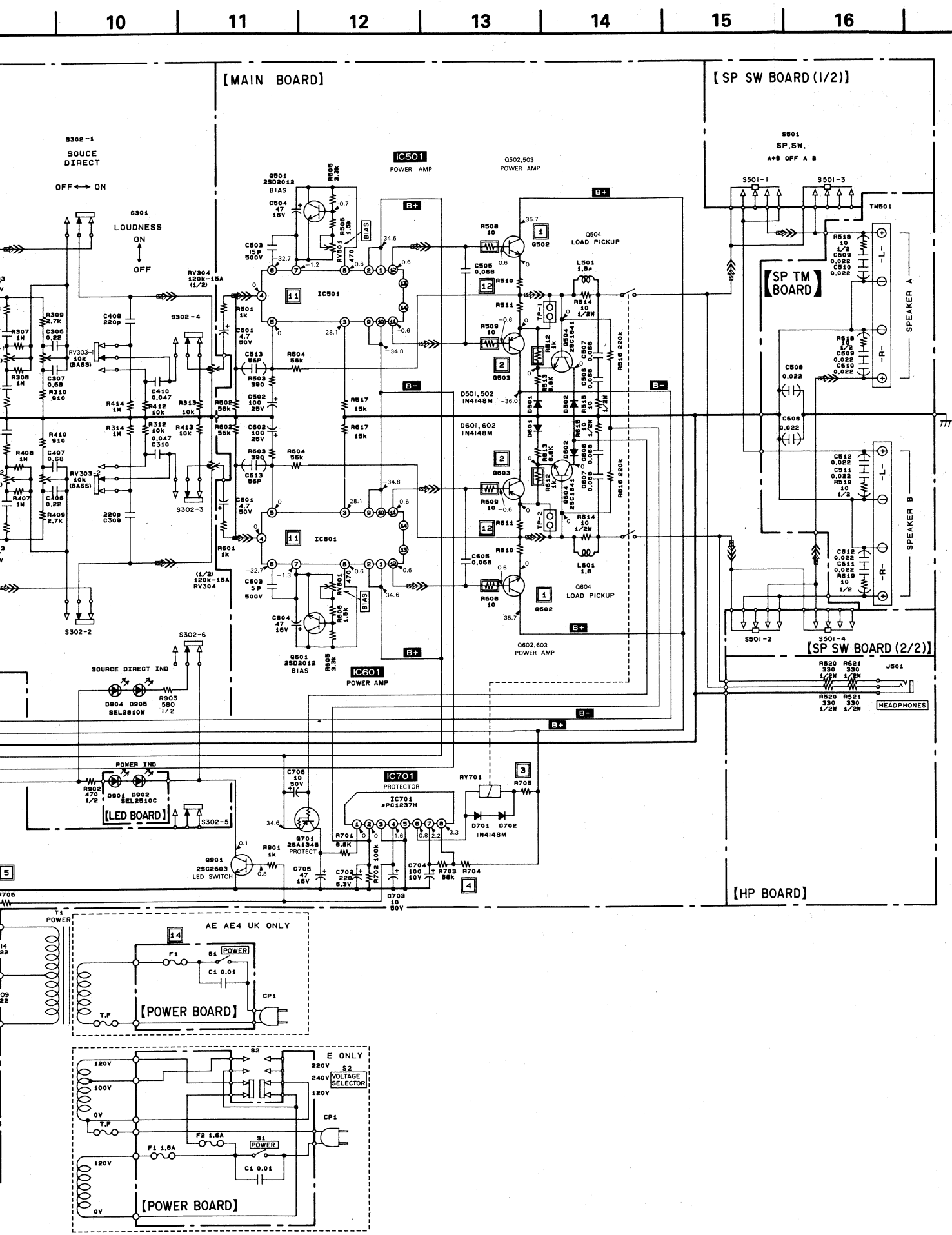
R801 120 3W

R802 470 3W

C807 47 50V

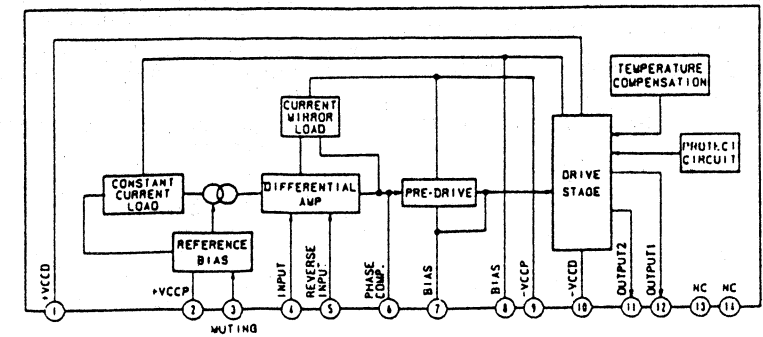
C808 50V

C801 6800 50V</

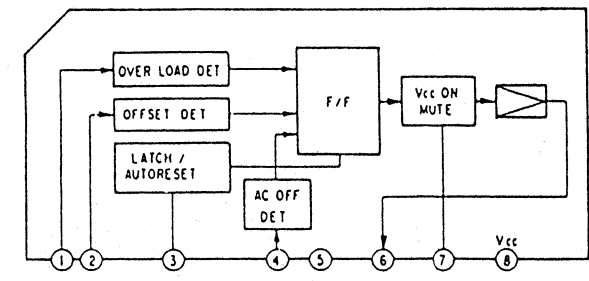


IC Block Diagrams

IC501, 601 μ PC1298V



IC701 μ PC1237HA



Note:

- All capacitors are in μ F unless otherwise noted. pF: μ F 50 WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and $\frac{1}{4}$ W or less unless otherwise specified.
- \square : nonflammable resistor.

Note:

The components identified by mark Δ or dotted line with mark Δ are critical for safety. Replace only with part number specified.

Note:

Les composants identifiés par une marque Δ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

- B+**: B + Line.
- B-**: B - Line.
- \square : adjustment for repair.
- Voltages and waveforms are dc with respect to ground under no-signal (detuned) conditions.
- Voltages are taken with a VOM (10 M Ω /V).
- Voltage variations may be noted due to normal production tolerances.
- Signal path.
- \Rightarrow : PHONO

SECTION 5 EXPLODED VIEWS

NOTE:

- -XX and -X mean standardized parts, so they may have some difference from the original one.

- Color Indication of Appearance Parts
Example:
KNOB, BALANCE (WHITE) ... (RED)

Parts Color Cabinet's Color

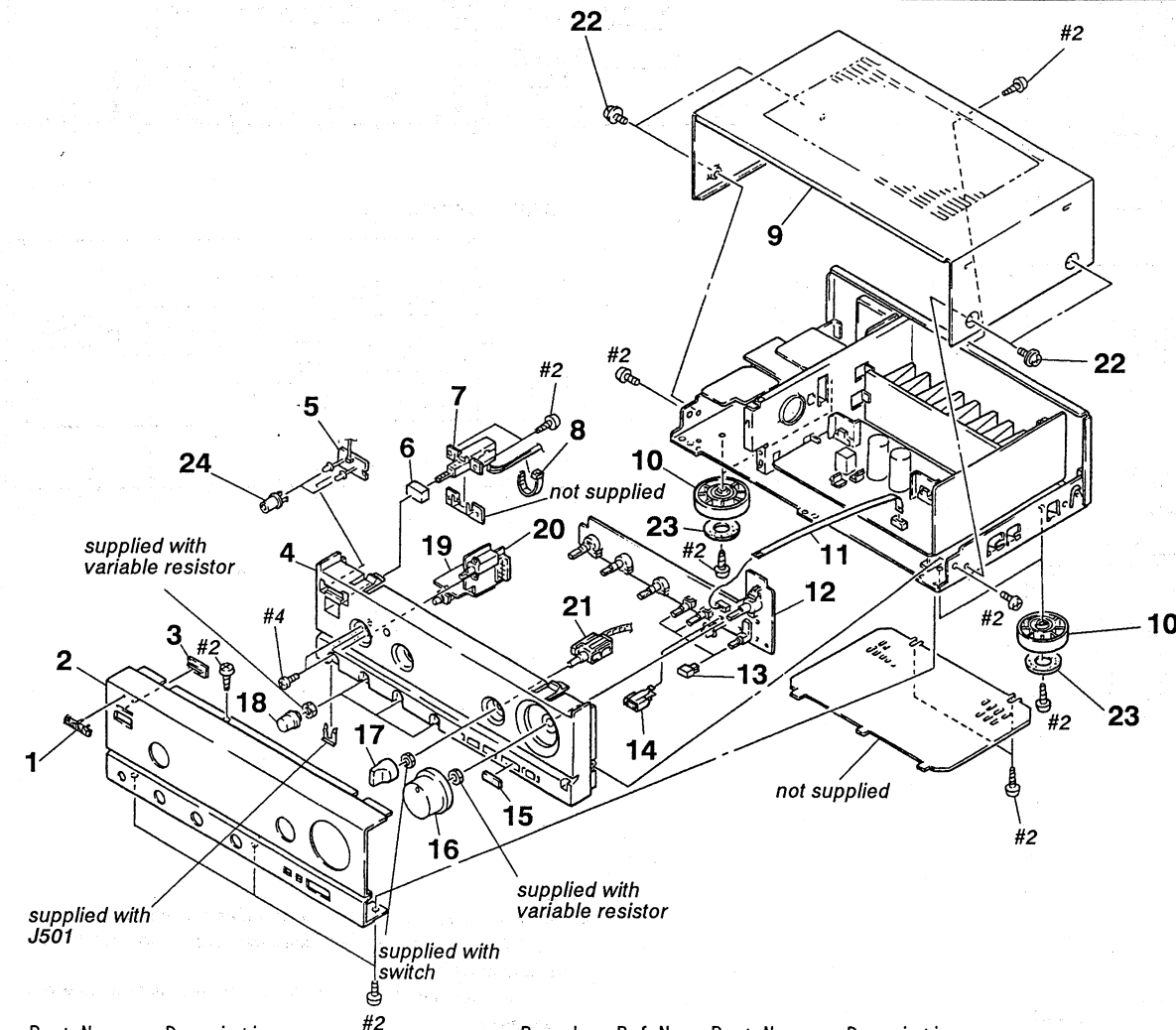
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

- The mechanical parts with no reference number in the exploded views are not supplied.

- Hardware (# mark) list is given in the last of this parts list.

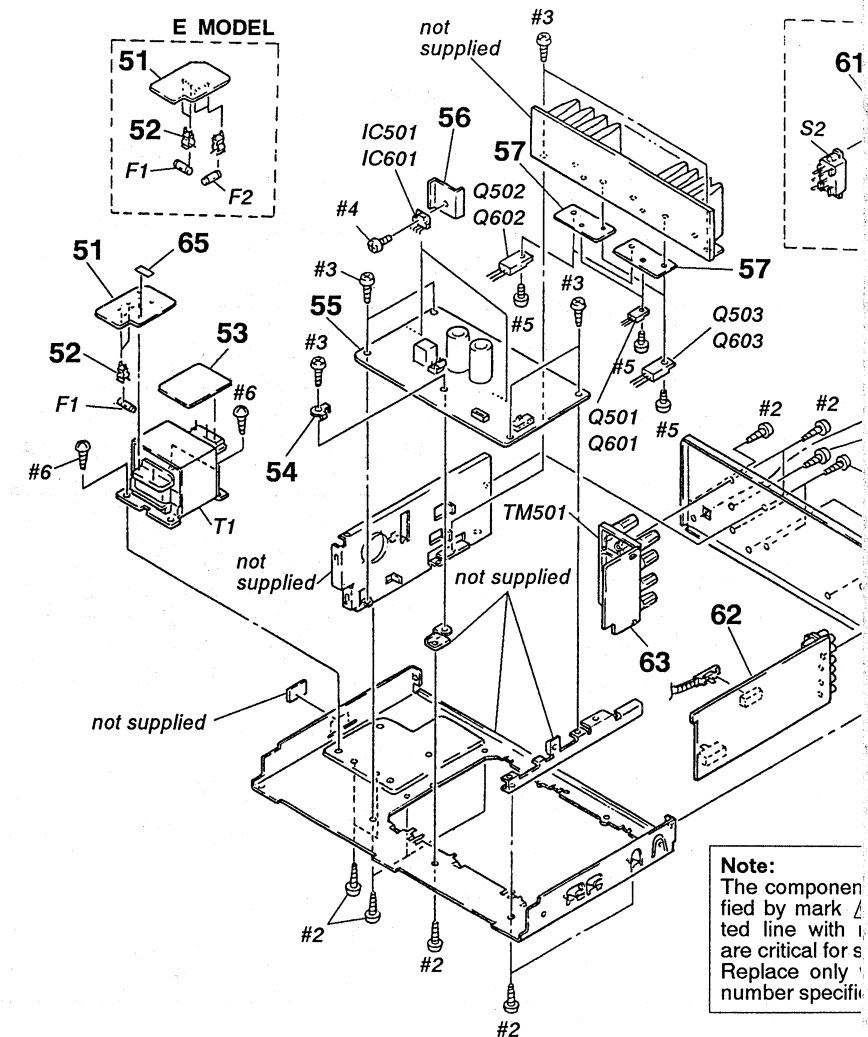
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Les composants identifiés par une marque Δ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.



Ref. No.	Part No.	Description	Remark
1	4-908-848-01	EMBLEM, SONY	
2	4-945-182-01	PANEL, FRONT (F170)	
2	4-945-182-11	PANEL, FRONT (F240)	
3	4-945-175-01	INDICATOR (PSW)	
4	* 4-945-181-01	PANEL (BASE), FRONT	
5	* 1-639-817-11	LED BOARD	
6	4-929-289-01	BUTTON	
7	1-553-318-41	SWITCH, PUSH (AC POWER) (1 KEY)	
8	3-655-653-21	BAND (TAITON), BINDING (F170:AEP, UK, GERMANY/F240)	
9	4-929-294-11	CASE	
10	X-3304-938-2	FOOT ASSY	
11	1-590-036-11	WIRE, FLAT TYPE (13 CORE)	

Ref. No.	Part No.	Description	Remark
12	* A-4345-123-A	PANEL BOARD, COMPLETE (F240)	
12	* A-4345-133-A	PANEL BOARD, COMPLETE (F170)	
13	4-945-176-01	BUTTON (18X11)	
14	4-945-177-01	HOUSE, LIGHTING	
15	4-945-622-01	PLATE (S/D), INDICATION	
16	X-4941-616-1	KNOB (R53) ASSY	
17	4-945-173-01	KNOB (R21)	
18	4-945-174-01	KNOB (F25)	
19	* 1-639-812-11	H.P. BOARD	
20	* 1-639-811-11	SP SW BOARD	
21	1-572-803-11	SWITCH, ROTARY SLIDE (INPUT SELECTOR)	
22	3-704-366-01	SCREW (CASE) (M3X8)	
23	4-923-836-11	CUSHION	
24	* 3-362-478-21	HOLDER (T), LED	



Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
51	* 1-639-816-11	POWER BOARD		61	* 4-944-986-		
52	* 1-533-225-11	HOLDER, FUSE		61	* 4-944-986-		
53	* 1-639-818-11	TRANSFORMER BOARD		61	* 4-944-986-		
54	* 4-942-204-01	PLATE, GROUND		62	* 1-639-814-		
55	* A-4345-128-A	MAIN BOARD, COMPLETE (F240)		63	* 1-639-813-		
55	* A-4345-138-A	MAIN BOARD, COMPLETE (F170:AEP, UK)		64	* 1-569-007-		
55	* A-4345-143-A	MAIN BOARD, COMPLETE (F170:GERMANY)		65	3-701-947-		
55	* A-4345-154-A	MAIN BOARD, COMPLETE (F170:E)		CP1	* 1-575-651-		
56	* 4-931-998-11	HEAT SINK (S) (F170)		CP1	* 1-575-652-		
56	* 4-931-998-21	HEAT SINK (S) (F240)		CP1	* 1-575-653-		
57	4-945-480-01	SHEET, INSULATING		F1	* 1-532-286-		
58	* 3-703-571-11	BUSHING (S) (4516), CORD (F170:E)		F1	* 1-532-259-		
58	* 3-703-244-00	BUSHING (2104), CORD		F2	* 1-532-259-		
59	* 2-379-614-01	HOOK		S2	* 1-570-307-		
60	3-706-165-00	SCREW		T1	* 1-450-575-		
61	* 4-941-986-41	PANEL, BACK (F170:E)		T1	* 1-450-576-		
61	* 4-941-986-51	PANEL, BACK (F240)		T1	* 1-450-577-		
				T1	* 1-450-578-		
				T1	* 1-450-579-		

SECTION 6 ELECTRICAL PARTS LIST

MAIN SP SW H. P SP TM INPUT

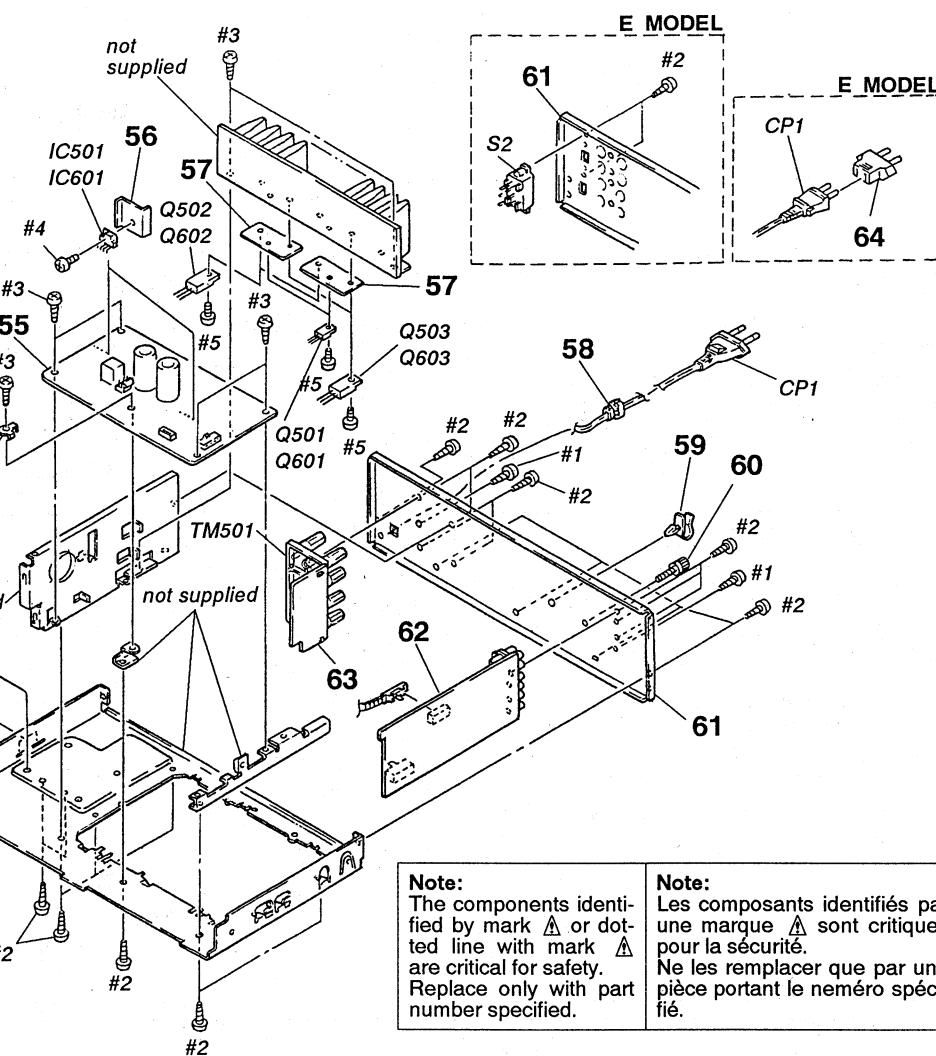
NOTE:

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX and -X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
All resistors are in ohms.
METAL: Metal-film resistor
METAL OXIDE: Metal Oxide-film resistor
F: nonflammable
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
In each case, u: μ , for example:
uA...: μ A..., uPA...: μ PA...,
uPB...: μ PB..., uPC...: μ PC...,
uPD...: μ PD...
- CAPACITORS
uF: μ F
- COILS
uH: μ H

The components identified by mark Δ or dotted line with mark Δ are critical for safety. Replace only with part number specified.

Les composants identifiés par une marque Δ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

When including parts by reference number, please include the board name.



Note:
The components identified by mark Δ or dotted line with mark Δ are critical for safety. Replace only with part number specified.

Note:
Les composants identifiés par une marque Δ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
		* A-4345-128-A MAIN BOARD, COMPLETE (F240)		C503	1-102-316-00	CERAMIC 15PF 5% 500V	
		* A-4345-138-A MAIN BOARD, COMPLETE (F170:AEP, UK)		C504	1-126-022-11	ELECT 47uF 20% 16V	
		* A-4345-143-A MAIN BOARD, COMPLETE (F170:GERMANY)		C505	1-136-163-00	FILM 0.068uF 5% 50V	
		* A-4345-154-A MAIN BOARD, COMPLETE (F170:E)		C506	1-136-163-00	FILM 0.068uF 5% 50V	
		*****		C507	1-136-163-00	FILM 0.068uF 5% 50V	
		* 1-639-811-11 SP SW BOARD		C508	1-136-157-00	FILM 0.022uF 5% 50V	
		*****				(F170:GERMANY)	
		* 1-639-812-11 H. P. BOARD		C509	1-136-157-00	FILM 0.022uF 5% 50V	
		*****				(F170:GERMANY)	
		* 1-639-813-11 SP TM BOARD		C510	1-136-157-00	FILM 0.022uF 5% 50V	
		*****				(F170:GERMANY)	
		* 1-639-814-11 INPUT BOARD		C511	1-136-157-00	FILM 0.022uF 5% 50V	
		*****				(F170:GERMANY)	
		* 4-931-998-11 HEAT SINK (S) (F170)		C512	1-136-157-00	FILM 0.022uF 5% 50V	
		* 4-931-998-21 HEAT SINK (S) (F240)				(F170:GERMANY)	
		* 4-942-204-01 PLATE, GROUND		C513	1-162-217-11	CERAMIC 56PF	
		7-682-548-04 SCREW +8VTT 3X8 (S)				(F170:GERMANY)	
		< CAPACITOR >		C601	1-126-163-11	ELECT 4.7uF 20% 50V	
C101	1-162-286-31	CERAMIC 220PF 10% 50V		C602	1-126-023-11	ELECT 100uF 20% 25V	
		(F170:GERMANY)		C603	1-102-316-00	CERAMIC 15PF 5% 500V	
C102	1-162-286-31	CERAMIC 220PF 10% 50V		C604	1-126-022-11	ELECT 47uF 20% 16V	
		(F170:GERMANY)		C605	1-136-163-00	FILM 0.068uF 5% 50V	
C103	1-162-286-31	CERAMIC 220PF 10% 50V		C606	1-136-163-00	FILM 0.068uF 5% 50V	
		(F170:GERMANY)		C607	1-136-163-00	FILM 0.068uF 5% 50V	
C104	1-162-286-31	CERAMIC 220PF 10% 50V		C608	1-136-157-00	FILM 0.022uF 5% 50V	
		(F170:GERMANY)				(F170:GERMANY)	
C105	1-162-286-31	CERAMIC 220PF 10% 50V		C609	1-136-157-00	FILM 0.022uF 5% 50V	
		(F170:GERMANY)				(F170:GERMANY)	
C106	1-164-075-11	CERAMIC 150PF 10% 50V		C610	1-136-157-00	FILM 0.022uF 5% 50V	
C107	1-164-070-11	CERAMIC 100PF 5% 50V				(F170:GERMANY)	
		(F170:GERMANY)		C611	1-136-157-00	FILM 0.022uF 5% 50V	
C108	1-126-163-11	ELECT 4.7uF 20% 50V				(F170:GERMANY)	
C109	1-164-075-11	CERAMIC 150PF 10% 50V		C612	1-136-157-00	FILM 0.022uF 5% 50V	
C110	1-126-051-11	ELECT 47uF 20% 50V				(F170:GERMANY)	
C111	1-130-480-00	MYLAR 0.0056uF 5% 50V		C613	1-162-217-11	CERAMIC 56PF	
C112	1-130-473-00	MYLAR 0.0015uF 5% 50V				(F170:GERMANY)	
C113	1-126-163-11	ELECT 4.7uF 20% 50V		C702	1-124-982-81	ELECT 220uF 20% 6.3V	
C120	1-126-022-11	ELECT 47uF 20% 16V		C703	1-126-059-11	ELECT 10uF 20% 50V	
C201	1-162-286-31	CERAMIC 220PF 10% 50V		C704	1-124-994-11	ELECT 100uF 20% 10V	
		(F170:GERMANY)		C705	1-126-022-11	ELECT 47uF 20% 16V	
C202	1-162-286-31	CERAMIC 220PF 10% 50V		C706	1-126-059-11	ELECT 10uF 20% 50V	
		(F170:GERMANY)				(F170:GERMANY)	
C203	1-162-286-31	CERAMIC 220PF 10% 50V		C801	1-125-686-11	ELECT 6800uF 20% 50V (F170)	
		(F170:GERMANY)		C801	1-128-342-11	ELECT 10000uF 20% 63V (F240)	
C204	1-162-286-31	CERAMIC 220PF 10% 50V				(F170:GERMANY)	
		(F170:GERMANY)		C802	1-125-686-11	ELECT 6800uF 20% 50V (F170)	
C205	1-162-286-31	CERAMIC 220PF 10% 50V		C802	1-128-342-11	ELECT 10000uF 20% 63V (F240)	
		(F170:GERMANY)				(F170:GERMANY)	
C206	1-164-075-11	CERAMIC 150PF 10% 50V		C803	1-124-921-11	ELECT 470uF 20% 63V (F240)	
C207	1-164-070-11	CERAMIC 100PF 5% 50V		C803	1-126-055-11	ELECT 470uF 20% 50V (F170)	
		(F170:GERMANY)				(F170:GERMANY)	
C208	1-126-163-11	ELECT 4.7uF 20% 50V		C804	1-124-921-11	ELECT 470uF 20% 63V (F240)	
C209	1-164-075-11	CERAMIC 150PF 10% 50V		C804	1-126-055-11	ELECT 470uF 20% 50V (F170)	
C210	1-126-051-11	ELECT 47uF 20% 50V				(F170:GERMANY)	
C211	1-130-480-00	MYLAR 0.0056uF 5% 50V		C805	1-124-916-11	ELECT 22uF 20% 63V (F240)	
C212	1-130-473-00	MYLAR 0.0015uF 5% 50V		C805	1-126-049-11	ELECT 22uF 20% 50V (F170)	
C213	1-126-163-11	ELECT 4.7uF 20% 50V				(F170:GERMANY)	
C220	1-126-022-11	ELECT 47uF 20% 16V		C806	1-124-916-11	ELECT 22uF 20% 63V (F240)	
C501	1-126-163-11	ELECT 4.7uF 20% 50V		C806	1-126-049-11	ELECT 22uF 20% 50V (F170)	
C502	1-126-023-11	ELECT 100uF 20% 25V				(F170:GERMANY)	

Remark	Ref. No.	Part No.	Description	Remark
	61	* 4-944-986-11	PANEL, BACK (F170:AEP)	
	61	* 4-944-986-21	PANEL, BACK (F170:GERMANY)	
	61	* 4-944-986-31	PANEL, BACK (F170:UK)	
	62	* 1-639-814-11	INPUT BOARD	
	63	* 1-639-813-11	SP TM BOARD	
	64	Δ 1-569-007-11	ADAPTOR, CONVERSION 2P (F170:E)	
	65	3-701-947-15	LABEL (2.5A), FUSE (F240)	
	CP1	Δ 1-575-651-11	CORD, POWER (AEP, GERMANY)	
	CP1	Δ 1-575-652-11	CORD, POWER (UK)	
	CP1	Δ 1-575-653-11	CORD, POWER (E)	
	F1	Δ 1-532-286-00	FUSE (F240)	
	F1	Δ 1-532-259-00	FUSE (F170)	
	F2	Δ 1-532-259-00	FUSE (F170:E)	
	S2	Δ 1-570-307-11	SWITCH, VOLTAGE CHANGE (F170:E)	
	T1	Δ 1-450-575-11	TRANSFORMER, POWER (F240)	
	T1	Δ 1-450-576-11	TRANSFORMER, POWER (F170:AEP)	
	T1	Δ 1-450-577-11	TRANSFORMER, POWER (F170:GERMANY)	
	T1	Δ 1-450-578-11	TRANSFORMER, POWER (F170:UK)	
	T1	Δ 1-450-579-11	TRANSFORMER, POWER (F170:E)	

MAIN

SP SW

H. P

SP TM

INPUT

Ref.No.	Part No.	Description	Remark
C807	1-126-051-11	ELECT	47uF 20% 50V (F170)
C807	1-126-062-11	ELECT	47uF 20% 63V (F240)
C808	1-126-051-11	ELECT	47uF 20% 50V (F170)
C808	1-126-062-11	ELECT	47uF 20% 63V (F240)
C809	1-106-375-12	MYLAR	0.022uF 5% 200V
C810	1-126-104-11	ELECT	470uF 20% 35V
C811	1-126-104-11	ELECT	470uF 20% 35V
C812	1-126-023-11	ELECT	100uF 20% 25V
C813	1-126-023-11	ELECT	100uF 20% 25V
C814	1-106-375-12	MYLAR	0.022uF 5% 200V

< CONNECTOR >

CN501	* 1-568-832-11	SOCKET, CONNECTOR 13P
CNJ101	* 1-566-883-61	JACK, PIN 6P
CNJ102	* 1-566-883-51	JACK, PIN 6P
CNJ103	? 1-573-299-11	CONNECTOR, BOARD TO BOARD 10P
CNP301	? 1-573-296-11	CONNECTOR, BOARD TO BOARD 10P
CNP502	* 1-564-243-00	PIN, CONNECTOR 6P
CNP503	* 1-506-599-11	PIN, CONNECTOR 10P
CNP505	* 1-564-241-00	PIN, CONNECTOR 4P
CNP801	* 1-564-104-00	PIN, CONNECTOR 3P

< DIODE >

D501	8-719-912-20	DIODE 1SS120
D502	8-719-912-20	DIODE 1SS120
D601	8-719-912-20	DIODE 1SS120
D602	8-719-912-20	DIODE 1SS120
D701	8-719-912-20	DIODE 1SS120
D702	8-719-912-20	DIODE 1SS120
D703	8-719-200-77	DIODE 10E2N
D801	8-719-302-38	DIODE RBV-602-01
D802	8-719-200-77	DIODE 10E2N
D803	8-719-200-77	DIODE 10E2N
D804	8-719-200-77	DIODE 10E2N
D805	8-719-200-77	DIODE 10E2N

< IC >

IC101	8-759-636-74	IC M5218AP-22
IC501	8-759-109-06	IC uPC1298V (F170)
IC501	8-759-144-04	IC uPC1342V (F240)
IC601	8-759-109-06	IC uPC1298V (F170)
IC601	8-759-144-04	IC uPC1342V (F240)
IC701	8-759-111-68	IC uPC1237HA
IC801	8-759-231-59	IC TA7815S
IC802	8-759-245-87	IC TA7915S

< JACK >

J501	1-507-796-71	JACK (HEADPHONES)
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Ref.No.	Part No.	Description	Remark
		< COIL >	
L501	* 1-420-872-00	COIL, AIR CORE	
L601	* 1-420-872-00	COIL, AIR CORE	
		< TRANSISTOR >	
Q501	8-729-209-15	TRANSISTOR 2SD2012	
Q502	8-729-320-83	TRANSISTOR 2SC3855-0Y	(F170:GERMANY/F240)
Q502	8-729-321-96	TRANSISTOR 2SC3854-0Y	(F170:AEP, UK, E)
Q503	8-729-320-86	TRANSISTOR 2SA1491-0Y	(F170:GERMANY/F240)
Q503	8-729-322-02	TRANSISTOR 2SA1490-OPY	(F170:AEP, UK, E)
Q504	8-729-140-84	TRANSISTOR 2SC1841TP-PAFAEA	
Q601	8-729-209-15	TRANSISTOR 2SD2012	
Q602	8-729-320-83	TRANSISTOR 2SC3855-0Y	(F170:GERMANY/F240)
Q602	8-729-321-96	TRANSISTOR 2SC3854-0Y	(F170:AEP, UK, E)
Q603	8-729-320-86	TRANSISTOR 2SA1491-0Y	(F170:GERMANY/F240)
Q603	8-729-322-02	TRANSISTOR 2SA1490-OPY	(F170:AEP, UK, E)
Q604	8-729-140-84	TRANSISTOR 2SC1841TP-PAFAEA	
Q701	8-729-900-63	TRANSISTOR DTA124ES	
Q801	8-729-111-55	TRANSISTOR 2SD1312-K	
Q802	8-729-924-90	TRANSISTOR 2SB1370-EF	
Q901	8-729-620-05	TRANSISTOR 2SC2603-EF	

< RESISTOR >

R101	1-249-417-11	CARBON	1K	5%	1/4W
R102	1-249-413-11	CARBON	470	5%	1/4W (F170:GERMANY)
R103	1-249-413-11	CARBON	470	5%	1/4W (F170:GERMANY)
R104	1-249-413-11	CARBON	470	5%	1/4W (F170:GERMANY)
R105	1-249-413-11	CARBON	470	5%	1/4W (F170:GERMANY)
R106	1-249-417-11	CARBON	1K	5%	1/4W
R107	1-247-903-00	CARBON	1M	5%	1/4W
R108	1-247-903-00	CARBON	1M	5%	1/4W
R109	1-247-903-00	CARBON	1M	5%	1/4W
R110	1-247-903-00	CARBON	1M	5%	1/4W
R111	1-249-441-11	CARBON	100K	5%	1/4W
R112	1-249-418-11	CARBON	1.2K	5%	1/4W (F170:GERMANY)
R113	1-249-441-11	CARBON	100K	5%	1/4W
R114	1-249-416-11	CARBON	820	5%	1/4W
R115	1-247-897-11	CARBON	560K	5%	1/4W
R116	1-249-437-11	CARBON	47K	5%	1/4W
R117	1-249-409-11	CARBON	220	5%	1/4W
R118	1-249-441-11	CARBON	100K	5%	1/4W
R201	1-249-417-11	CARBON	1K	5%	1/4W
R202	1-249-413-11	CARBON	470	5%	1/4W (F170:GERMANY)
R203	1-249-413-11	CARBON	470	5%	1/4W (F170:GERMANY)
R204	1-249-413-11	CARBON	470	5%	1/4W (F170:GERMANY)
R205	1-249-413-11	CARBON	470	5%	1/4W (F170:GERMANY)
R206	1-249-417-11	CARBON	1K	5%	1/4W

MAIN

SP SW

H. P

SP TM

INPUT

PANEL

Note:
The components identified by mark Δ or dotted line with mark Δ are critical for safety. Replace only with part number specified.

Note:
Les composants identifiés par une marque Δ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

Ref. No.	Part No.	Description	Remark
R207	1-247-903-00	CARBON 1M 5% 1/4W	
R208	1-247-903-00	CARBON 1M 5% 1/4W	
R209	1-247-903-00	CARBON 1M 5% 1/4W	
R210	1-247-903-00	CARBON 1M 5% 1/4W	
R211	1-249-441-11	CARBON 100K 5% 1/4W	
R212	1-249-418-11	CARBON 1.2K 5% 1/4W (F170:GERMANY)	
R213	1-249-441-11	CARBON 100K 5% 1/4W	
R214	1-249-416-11	CARBON 820 5% 1/4W	
R215	1-247-897-11	CARBON 560K 5% 1/4W	
R216	1-249-437-11	CARBON 47K 5% 1/4W	
R217	1-249-409-11	CARBON 220 5% 1/4W	
R218	1-249-441-11	CARBON 100K 5% 1/4W	
R501	1-249-417-11	CARBON 1K 5% 1/4W	
R502	1-249-438-11	CARBON 56K 5% 1/4W	
R503	1-249-412-11	CARBON 390 5% 1/4W	
R504	1-249-466-11	CARBON 56K 5% 1/4W	
R505	1-249-423-11	CARBON 3.3K 5% 1/4W	
R506	1-249-419-11	CARBON 1.5K 5% 1/4W	
R508	1-247-688-11	CARBON 10 5% 1/4W	
R509	1-247-688-11	CARBON 10 5% 1/4W	
R510 Δ	1-216-361-00	METAL OXIDE 0.22 5% 2W F (F170)	
R510 Δ	1-217-611-00	METAL OXIDE 0.1 10% 2W F (F240)	
R511 Δ	1-216-361-00	METAL OXIDE 0.22 5% 2W F (F170)	
R511 Δ	1-217-611-00	METAL OXIDE 0.1 10% 2W F (F240)	
R512	1-247-713-11	CARBON 1K 5% 1/4W	
R513	1-249-427-11	CARBON 6.8K 5% 1/4W	
R514	1-247-727-11	CARBON 10 5% 1/2W	
R515	1-247-727-11	CARBON 10 5% 1/2W	
R516	1-247-887-00	CARBON 220K 5% 1/4W	
R517	1-249-431-11	CARBON 15K 5% 1/4W	
R518	1-247-727-11	CARBON 10 5% 1/2W (F170:GERMANY)	
R519	1-247-727-11	CARBON 10 5% 1/2W (F170:GERMANY)	
R520	1-247-745-11	CARBON 330 5% 1/2W	
R521	1-247-745-11	CARBON 330 5% 1/2W	
R601	1-249-417-11	CARBON 1K 5% 1/4W	
R602	1-249-438-11	CARBON 56K 5% 1/4W	
R603	1-249-412-11	CARBON 390 5% 1/4W	
R604	1-249-466-11	CARBON 56K 5% 1/4W	
R605	1-249-423-11	CARBON 3.3K 5% 1/4W	
R606	1-249-419-11	CARBON 1.5K 5% 1/4W	
R608	1-247-688-11	CARBON 10 5% 1/4W	
R609	1-247-688-11	CARBON 10 5% 1/4W	
R610 Δ	1-216-361-00	METAL OXIDE 0.22 5% 2W F (F170)	
R610 Δ	1-217-611-00	METAL OXIDE 0.1 10% 2W F (F240)	
R611 Δ	1-216-361-00	METAL OXIDE 0.22 5% 2W F (F170)	
R611 Δ	1-217-611-00	METAL OXIDE 0.1 10% 2W F (F240)	
R612	1-247-713-11	CARBON 1K 5% 1/4W	
R613	1-249-427-11	CARBON 6.8K 5% 1/4W	
R614	1-247-727-11	CARBON 10 5% 1/2W	
R615	1-247-727-11	CARBON 10 5% 1/2W	
R616	1-247-887-00	CARBON 220K 5% 1/4W	
R617	1-249-431-11	CARBON 15K 5% 1/4W	
R618	1-247-727-11	CARBON 10 5% 1/2W (F170:GERMANY)	
R619	1-247-727-11	CARBON 10 5% 1/2W (F170:GERMANY)	

Ref. No.	Part No.	Description	Remark
R620	1-247-745-11	CARBON 330 5% 1/2W	
R621	1-247-745-11	CARBON 330 5% 1/2W	
R701	1-249-427-11	CARBON 6.8K 5% 1/4W	
R702	1-249-441-11	CARBON 100K 5% 1/4W	
R703	1-249-439-11	CARBON 68K 5% 1/4W	
R704	1-249-430-11	CARBON 12K 5% 1/4W (F170)	
R704	1-249-431-11	CARBON 15K 5% 1/4W (F240)	
R705 Δ	1-215-868-00	METAL OXIDE 680 5% 1W F (F240)	
R705 Δ	1-216-430-11	METAL OXIDE 390 5% 1W F (F170)	
R706	1-249-427-11	CARBON 6.8K 5% 1/4W (F170:GERMANY)	
R706	1-249-428-11	CARBON 8.2K 5% 1/4W (F170:AEP, UK, E)	
R706	1-249-429-11	CARBON 10K 5% 1/4W (F240)	
R801 Δ	1-215-912-11	METAL OXIDE 150 5% 3W F (F170:AEP, UK, E)	
R801 Δ	1-216-475-11	METAL OXIDE 120 5% 3W F (F170:GERMANY)	
R801 Δ	1-216-478-11	METAL OXIDE 390 5% 3W F (F240)	
R802 Δ	1-215-915-11	METAL OXIDE 470 5% 3W F (F170:GERMANY)	
R802 Δ	1-215-918-00	METAL OXIDE 1.5K 5% 3W F (F240)	
R802 Δ	1-216-479-11	METAL OXIDE 560 5% 3W F (F170:AEP, UK, E)	
R805	1-249-417-11	CARBON 1K 5% 1/4W	
R806	1-249-417-11	CARBON 1K 5% 1/4W	
R901	1-249-417-11	CARBON 1K 5% 1/4W	
< VARIABLE RESISTOR >			
RV501	1-238-596-11	RES. ADJ. CARBON 470	
RV601	1-238-596-11	RES. ADJ. CARBON 470	
< RELAY >			
RY701	1-515-501-00	RELAY	
< SWITCH >			
S303	1-572-804-11	SWITCH, SLIDE (INPUT SELECTOR)	
S501	1-571-973-11	SWITCH, ROTARY (SPEAKERS)	
< TERMINAL >			
TM501	1-537-227-11	TERMINAL BOARD (SP) (F170:AEP)	
TM501	1-537-228-11	TERMINAL BOARD (SP) (F170:GERMANY)	
TM501	1-537-235-11	TERMINAL BOARD (SP) (F170:UK, E/F240)	
TM801	1-808-881-91	THERMISTOR (POSITIVE) 2.2	
TM802	1-808-881-91	THERMISTOR (POSITIVE) 2.2	

* A-4345-123-A PANEL BOARD, COMPLETE (F240)

* A-4345-133-A PANEL BOARD, COMPLETE (F170)

Note:

The components identified by mark Δ or dotted line with mark Δ are critical for safety. Replace only with part number specified.

Note:

Les composants identifiés par une marque Δ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

PANEL**POWER****LED****TRANSFORMER**

Ref. No.	Part No.	Description			
	* 1-639-816-11	POWER BOARD			

	* 1-639-817-11	LED BOARD			

	* 1-639-818-11	TRANSFORMER BOARD			

	1-533-225-11	HOLDER, FUSE			
	* 1-564-214-11	PIN, CONNECTOR 3P			
	* 3-362-478-21	HOLDER (T), LED			
		< CAPACITOR >			
C1	△ 1-161-744-00	CERAMIC	0.01uF		400V
C301	1-126-163-11	ELECT	4.7uF	20%	50V
C302	1-162-217-31	CERAMIC	56PF	5%	50V
C303	1-126-163-11	ELECT	4.7uF	20%	50V
C304	1-136-155-00	FILM	0.015uF	5%	50V
C305	1-136-161-00	FILM	0.047uF	5%	50V
C306	1-136-169-00	FILM	0.22uF	5%	50V
C307	1-136-175-00	FILM	0.68uF	5%	50V
C309	1-162-286-31	CERAMIC	220PF	10%	50V
C310	1-136-161-00	FILM	0.047uF	5%	50V
C311	1-126-022-11	ELECT	47uF	20%	16V
C401	1-126-163-11	ELECT	4.7uF	20%	50V
C402	1-162-217-31	CERAMIC	56PF	5%	50V
C403	1-126-163-11	ELECT	4.7uF	20%	50V
C404	1-136-155-00	FILM	0.015uF	5%	50V
C405	1-136-161-00	FILM	0.047uF	5%	50V
C406	1-136-169-00	FILM	0.22uF	5%	50V
C407	1-136-175-00	FILM	0.68uF	5%	50V
C409	1-162-286-31	CERAMIC	220PF	10%	50V
C410	1-136-161-00	FILM	0.047uF	5%	50V
C411	1-126-022-11	ELECT	47uF	20%	16V
		< CONNECTOR >			
CN301	* 1-568-832-11	SOCKET, CONNECTOR 13P			
CNP2	* 1-564-321-00	PIN, CONNECTOR 2P			
CNP3	* 1-564-321-00	PIN, CONNECTOR 2P			
CNP4	* 1-564-321-00	PIN, CONNECTOR 2P (F170:E)			
CNP5	* 1-564-687-11	PIN, CONNECTOR 3P (F170:E)			
		< CORD, POWER >			
CP1	△ 1-575-651-11	CORD, POWER (AEP, GERMANY)			
CP1	△ 1-575-652-11	CORD, POWER (UK)			
CP1	△ 1-575-653-11	CORD, POWER (E)			
		< DIODE >			
D901	8-719-303-00	DIODE SEL2510C-C			
D902	8-719-303-00	DIODE SEL2510C-C			
D904	8-719-301-52	DIODE SEL2810A-C			
D905	8-719-301-52	DIODE SEL2810A-C			
		< FUSE >			
F1	△ 1-532-286-00	FUSE TIME-LAG 2.5A (F240)			
F1	△ 1-532-259-00	FUSE TIME-LAG 1.6A (F170)			
F2	△ 1-532-259-00	FUSE TIME-LAG 1.6A (F170:E)			

Ref. No.	Part No.	Description	Remark
	< IC >		
IC301	8-759-634-50	IC M5218AL	
	< RESISTOR >		
R119	1-249-405-11	CARBON 100 5% 1/4W	
R219	1-249-405-11	CARBON 100 5% 1/4W	
R301	1-249-417-11	CARBON 1K 5% 1/4W	
R302	1-249-417-11	CARBON 1K 5% 1/4W	
R303	1-249-423-11	CARBON 3.3K 5% 1/4W	
R304	1-249-442-11	CARBON 510 5% 1/4W	
R305	1-249-442-11	CARBON 510 5% 1/4W	
R306	1-249-408-11	CARBON 180 5% 1/4W	
R307	1-247-903-00	CARBON 1M 5% 1/4W	
R308	1-247-903-00	CARBON 1M 5% 1/4W	
R309	1-249-422-11	CARBON 2.7K 5% 1/4W	
R310	1-247-830-11	CARBON 910 5% 1/4W	
R311	1-249-441-11	CARBON 100K 5% 1/4W	
R312	1-249-429-11	CARBON 10K 5% 1/4W	
R313	1-249-429-11	CARBON 10K 5% 1/4W	
R314	1-247-903-00	CARBON 1M 5% 1/4W	
R401	1-249-417-11	CARBON 1K 5% 1/4W	
R402	1-249-417-11	CARBON 1K 5% 1/4W	
R403	1-249-423-11	CARBON 3.3K 5% 1/4W	
R404	1-249-442-11	CARBON 510 5% 1/4W	
R405	1-249-442-11	CARBON 510 5% 1/4W	
R406	1-249-408-11	CARBON 180 5% 1/4W	
R407	1-247-903-00	CARBON 1M 5% 1/4W	
R408	1-247-903-00	CARBON 1M 5% 1/4W	
R409	1-249-422-11	CARBON 2.7K 5% 1/4W	
R410	1-247-830-11	CARBON 910 5% 1/4W	
R411	1-249-441-11	CARBON 100K 5% 1/4W	
R412	1-249-429-11	CARBON 10K 5% 1/4W	
R413	1-249-429-11	CARBON 10K 5% 1/4W	
R414	1-247-903-00	CARBON 1M 5% 1/4W	
R902	1-247-747-11	CARBON 470 5% 1/2W	
R903	1-247-749-11	CARBON 560 5% 1/2W	
	< VARIABLE RESISTOR >		
RV301	1-238-513-11	RES. VAR. CARBON 150K/150K (BALANCE)	
RV302	1-241-548-11	RES. VAR. CARBON 10K (TREBLE)	
RV303	1-241-549-11	RES. VAR. CARBON 10K (BASS)	
RV304	1-241-550-11	RES. VAR. CARBON 120K/120K (VOLUME)	
	< SWITCH >		
S1	1-553-318-11	SWITCH, PUSH (1 KEY) (POWER)	
S2	Δ 1-570-307-11	SWITCH (VOLTAGE SELECTOT) (F170:E)	
S301	1-571-112-21	SWITCH, PUSH (1 KEY) (LOUDNESS)	
S302	1-572-642-11	SWITCH, PUSH (1 KEY) (SOURCE DIRECT)	
S304	1-571-872-11	SWITCH, PUSH (1 KEY) (TAPE/DAT MONITOR)	
	< TRANSFORMER >		
T1	Δ 1-450-575-11	TRANSFORMER, POWER (F240)	
T1	Δ 1-450-576-11	TRANSFORMER, POWER (F170:AEP)	
T1	Δ 1-450-577-11	TRANSFORMER, POWER (F170:GERMANY)	

PANEL

POWER

LED

TRANSFORMER

Ref. No.	Part No.	Description	Remark
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T1	△	1-450-578-11 TRANSFORMER, POWER (F170:UK)	
T1	△	1-450-579-11 TRANSFORMER, POWER (F170:E)	

MISCELLANEOUS

7		1-553-318-41 SWITCH, PUSH (AC POWER) (1 KEY)	
11		1-590-036-11 WIRE, FLAT TYPE (13 CORE)	
21		1-572-803-11 SWITCH, ROTARY SLIDE (INPUT SELECTOR)	
64	△	1-569-007-11 ADAPTOR, CONVERSION 2P (F170:E)	

ACCESSORY & PACKING MATERIAL

*	3-704-343-01	SHEET (STANDARD), PROTECTION (F240)	
	3-753-389-11	MANUAL, INSTRUCTION (ENGLISH, FRENCH, SPANISH, PORTUGUESE) (AEP, UK, E, GERMANY)	
	3-753-389-41	MANUAL, INSTRUCTION (GERMAN, DUTCH, SWEDISH, ITALIAN) (AEP)	
*	4-944-050-01	INDIVIDUAL CARTON	
*	4-945-810-01	CUSHION (LEFT) (F240)	
*	4-945-811-01	CUSHION (RIGHT) (F240)	

HARDWARE LIST

# 1	7-621-849-00	SCREW (BV/RING)	
# 2	7-685-646-79	SCREW +BVTP 3X8 TYPE2 N-S	
# 3	7-685-647-79	SCREW +BVTP 3X10 TYPE2 N-S	
# 4	7-682-548-04	SCREW +BVTT 3X8 (S)	
# 5	7-682-549-04	SCREW +BVTT 3X10 (S)	
# 6	7-682-560-04	SCREW +BVTT 4X6 (S)	

Note:

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Note:

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